

DECOLOURISATION OF BEET SUGAR SYRUP USING ACTIVATED CARBON AND GLUCOSE OXIDASE ENZYME

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Abstract. The aim of this study was to develop and optimize a new approach for decolourisation of beet sugar syrup. In the proposed method, activated carbon (AC) was utilized to adsorb the organic colorants from the syrup. Meanwhile, the *in-situ* generation of hydrogen peroxide by the glucose oxidase (GOx) enzyme facilitated the decomposition of heavy-weight colorants to smaller molecules. Combining of the physical adsorption with the enzymatic reaction was allowed improving the decolourisation of beet sugar syrup from 35.29 to 83.68% compared to the basic adsorption by AC after 120 min of operation under the optimum conditions. The maximum decolourisation efficiency by the combined process was achieved at GOx dosage of 0.07 g, 20 mM glucose concentration, and solution pH 7, at the temperature of 30°C using 0.01 g of AC particles. Given the high effectiveness, reusability, and the eco-friendly nature of the process, the AC/GOx system can serve as an alternative to ordinary decolourisation techniques.

Keywords: beet sugar syrup, decolourisation, activated carbon, hydrogen peroxide, glucose oxidase.

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